



**US Army Corps
of Engineers**
Engineer Research and
Development Center

News Release

Release No. A03-00

Contact: **PUBLIC AFFAIRS OFFICE**

For Release: Immediately

Phone: **(703) 428-6655**

Topographic Engineering Center • 7701 Telegraph Road • Alexandria, VA 22315-3864 • <http://www.erdc.usace.army.mil>

TEC develops new Global Positioning System-based hydrographic navigation system

A new global positioning system (GPS)-based hydrographic navigation system has been developed, which eliminates tidal uncertainties of hydrographic surveys in coastal areas. The Real-Time Kinematic (RTK) GPS Tides concept was developed at the U.S. Army Corps of Engineers' Engineer Research and Development Center's Topographic Engineering Center, Alexandria, Va. The system was initially implemented in the Saint Mary's Entrance Channel in the Jacksonville (Fla.) District. This method is the only technique allowed to be used during contract dredging operations in the Saint Mary's Entrance Channel. TEC is pursuing a patent for this dredging technology. Another patent application for vessel navigation also has been filed.

The highly accurate system uses a land-based GPS reference station operating in a carrier differential mode of operation. Radio signals transmit carrier differential information to ships in the approach channels, enabling properly equipped GPS receivers onboard to produce centimeter-level, three-dimensional positions every second. This position information is coupled with the ships keel distance below the GPS receiver to determine the keel height above a predefined grid of the navigation channel and specifically the project depth or the bottom of the navigation channel. The bottom of the navigation channel should be slightly above the actual bathymetry. If it's not, a shoal has formed in the navigation channel and dredging is required to remove the shoal.

The RTK GPS Water Navigation method allows ships to load more precisely with respect to the bottom of the navigation channel. Today, ships know depths below the keel, but the information is not relative to a fixed vertical datum

-more-

2/2/2

and the actual bottom changes continuously. The new method allows deep draft vessels to carry more cargo.

The system's inventor, Mr. Brian Shannon is licensed both as a professional engineer and a land surveyor in the Commonwealth of Virginia. Mr. Shannon holds a Bachelor of Science degree in Civil Engineering from Old Dominion University. He is a member of Tau Beta Pi (the National Engineering Society) and Chi Epsilon (the National Civil Engineering Society), and the Virginia Association of Surveyors.

